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A NEW COMBINATION AND NEW CHROMOSOME COUNTS IN THE TARWEED TRIBE (COMPOSITAE–MADIEAE)

BRUCE G. BALDWIN
Jepson Herbarium and Department of Integrative Biology, University of California,
Berkeley, CA 94720-2465
bbaldwin@berkeley.edu

ABSTRACT

A new combination, **Deinandra peninsularis** (Moran) B. G. Baldwin, comb. nov., is proposed for *D. greeneana* subsp. *peninsularis* of Baja California, Mexico, a taxon that does not belong within *D. greeneana*, based on recent molecular and cytogenetic work. New chromosome counts for *D. peninsularis* and *D. streetsii* and previously reported counts for the other 20 species of *Deinandra* indicate that all perennial or facultatively perennial taxa of the genus share the modal, and probably basal, chromosome number of $2n = 12_{II}$. A new chromosome count for another member of the tarweed tribe, *Arnica mallotopus* [≡ *Mallotopus japonicus*] ($2n = 19_{II}$), in Arnicinae, strongly contrasts with an earlier (somatic) count for that species ($2n = 18$), which is often treated in a different genus based in part on the previously reported chromosome number.

Key Words: *Arnica*, Asteraceae, Baja California, chromosome counts, *Deinandra*, Guadalupe Island, Madiinae, tarweeds.

Recent molecular phylogenetic and cytogenetic studies of *Deinandra* Greene sensu Baldwin (1999) [= *Hemizonia* DC. sect. *Madiomeris* sensu Tanowitz (1982) plus "Fruticosae" or "Zonamra" (Clausen 1951; Keck 1959)] indicate that *D. greeneana* (Rose) B. G. Baldwin subsp. *greeneana*, of Guadalupe Island (Baja California, Mexico), is more closely related to the other two Guadalupe Island endemics in *Deinandra*, *D. frutescens* (A. Gray) B. G. Baldwin and *D. palmeri* (Rose) B. G. Baldwin, than to *D. greeneana* subsp. *peninsularis* (Moran) B. G. Baldwin, from peninsular Baja California and the Todos Santos Islands, near Ensenada (Baldwin 2007). Based on those molecular and chromosomal findings, *D. greeneana* subsp. *peninsularis* does not belong within *D. greeneana* or any other described species of *Deinandra* and warrants taxonomic recognition at species rank.

Deinandra peninsularis (Moran) B. G. Baldwin, comb. nov. Basionym: *Hemizonia greeneana* subsp. *peninsularis* Moran, Transactions of the San Diego Society of Natural History 15:286. 1969. *Hemizonia greeneana* var. *peninsularis* (Moran) B. L. Turner. *Deinandra greeneana* subsp. *peninsularis* (Moran) B. G. Baldwin. Type: Mexico, Baja California, Punta Banda, summit of Banda Peak, *Moran 13437* (holotype, SD; isotypes, K, MEXU, UC, US, etc.).

As noted by Moran (1969), plants treated here as *Deinandra peninsularis* generally differ in habitat, growth form, and leaf, pappus, and fruit characters from the shrubby *D. greeneana* of Guadalupe Island. Artificial hybrids between another shrubby species from Guadalupe Island, *D. frutescens*, and *D. peninsularis*, which have been regarded as conspecific (as *D. frutescens*, e.g., Wiggins 1980; see Moran 1969), were of reduced fertility compared to hybrids between *D. frutescens* and either of the other two Guadalupe Island species (Baldwin 2007).

New chromosome counts were obtained, using the methods of Baldwin (1992), from *D. peninsularis* and other members of tribe Madieae sensu Baldwin (see Baldwin et al. 2002), in subtribes Arnicinae and Madiinae, for which chromosome numbers either have not been published or are at variance with the counts reported here, as indicated below. All counts were obtained from plants grown under greenhouse or growth-chamber conditions from wild-collected seed (for *Deinandra*) or from rhizomes obtained from the Tohoku University Botanical Garden, Japan (for *Arnica mallotopus*).

Deinandra peninsularis (Moran) B. G. Baldwin, $2n = 12_{II}$, Mexico, Baja California, Punta Banda, northwest of La Bufadora, N31°44′ W116°43′, *J. P. Rebman 6037* (SD).

Deinandra streetsii A. Gray, $2n = 12_{II}$, Mexico, Baja California, West San Benito Island (just s. of lighthouse), N28°18′ W115°35′, *S. Junak 5332* (SBBG).

With the addition of these new counts, all perennial or facultatively perennial taxa in *Deinandra* have been reported to have $2n = 12_{II}$, which is modal in the genus (Carr 2003) and may be the base chromosome number for *Deinandra* (Baldwin 2007).

Arnica mallotopus (Franch. & Sav.) Makino [= *Mallotopus japonicus* Franch. & Sav.], $2n = 19_{II}$, Japan, Honshu, Prefecture Yamagata, Mt. Iide, *T. Kikuchi s.n.* (TUSG 6126).

The previously reported somatic count of $2n = 18$ for *A. mallotopus* by Matsuura and Sutô (1935) does not appear to be the result of miscommunication of a meiotic number, based on their accompanying camera-lucida drawing, which shows 18 mitotic chromosomes. That earlier count and the unusual capitulescence morphology of this endemic Japanese species, with densely white-villous peduncles and cylindrical, discoid heads, have contributed to uncertainty about its relationships, as reflected by treatment of these plants within the monotypic genus *Mallotopus* Franch. & Sav. by some botanists. The count reported here is consistent with results of molecular phylogenetic data (Baldwin and Wessa 2000; Baldwin et al. 2002), which placed *A. mallotopus* well within the circumboreal (primarily North American) genus *Arnica* ($x = 19$).

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